

TITLE: BYCATCH—WHERE WE’VE BEEN, WHERE WE’RE GOING

ORGANIZERS:

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DESCRIPTION: This symposium will focus on national and international fisheries bycatch challenges and accomplishments.

FORMAT: 2-day session with 33 presenters, one ½-hour panel discussion, and a 1-hour panel discussion.

MODERATOR: Lee Benaka, Geraldine Vander Haegen

Date: August 11, 2003 **Time:** 1:40:00 PM **Room:** 204B **Abstract number:** SO-18-01

Authors:

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Routledge, Richard Centre for Coastal Studies, Statistics and Actuarial Science Department, Simon Fraser University, Burnaby, British Columbia, Canada, V5A 1S6

Full Title: Improving the Chances of Survival for Bycatch Fish

Abstract Text: One quarter of the world’s total commercial catch is discarded because it is not the right species or size. It is generally assumed that these discarded fish do not survive after capture and release. However, recent experiments conducted in various locations on the British Columbia coast indicate that it is possible to revive commercially captured non-target salmon and significantly improve their chances of long-term survival after release. In 1998, in response to conservation concerns for coho salmon on Canada’s west coast, Fisheries and Oceans Canada established a policy of Selective Fisheries, defined as "the ability to avoid known, non-target species and stocks or, if encountered, to release them alive and unharmed". Over the course of three summers, a unique partnership of academic and government scientists, commercial fishermen, members of the fishing industry, First Nations, coastal communities and Fisheries and Oceans Canada collaborated on experiments to test how to improve the chances of survival of salmon when released after capture by the commercial fishing fleet. Physiological parameters of muscle metabolism and post-capture stress and measures of swimming performance were indicators of recovery and delayed mortality following capture. Results of these experiments and follow-up actions will be discussed. The findings bring into question the practices of commercial fisheries globally with regard to the treatment of bycatch and stress the importance of experimenting with methods that could increase the chances for long-term survival of non-target, non-retention fish following release after capture.

Date: August 11, 2003 **Time:** 2:00:00 PM **Room:** 204B **Abstract number:** SO-18-02

Authors:

Gauvin, J.R.* Independent Consultant

Paine, B. United Catcher Boat Association

Full Title: When Bycatch Reduction Devices Become Preferred Fishing Gear: Industry Perspective on Incentives that Affect Development, Adoption, and Use of Selective Gear

Abstract Text: Groundfish fisheries in federal waters off Alaska are governed by a complex array of bycatch caps that trigger fishery-specific or area-specific closures. Prohibited species bycatch caps are currently in place for two species of Pacific salmon, Pacific halibut, Pacific herring, and three species of king and tanner crabs. Some fisheries such as walleye pollock *Theragra chalcogramma* are managed under fishing cooperatives that confer individual catch and bycatch assignments through private legal agreements among participants. Other multi-species fisheries, such as flatfish and Pacific cod *Gadus macrocephalus*, are still managed under a "race for fish" basis with no individual catch or bycatch assignments. This presentation will review current and past industry initiatives and programs for bycatch management and reduction in the context of the management and economic incentives affecting these fisheries. Specific emphasis will be on past and current development of bycatch reduction devices (BRDs) and the relative prospects for success in application of BRDs given the different management and economic structures affecting these fisheries.

Date: August 11, 2003 **Time:** 2:20:00 PM **Room:** 204B **Abstract number:** SO-18-03

Author:

Sathre, C.* Office of General Counsel, 1315 East-West Highway, 15th Floor, Silver Spring, MD 20910

Full Title: Legal Perspective on Bycatch

Abstract Text: This presentation will provide a legal perspective on bycatch.

Date: August 11, 2003 **Time:** 2:40:00 PM **Room:** 204B **Abstract number:** SO-18-04

Author:

Rayburn, R.* Texas Sea Grant College Program, 2700 Earl Rudder Freeway, South #1800, College Station, TX 77845

Full Title: Stakeholder Perspective on Bycatch

Abstract Text: Bycatch is the multi-headed dragon of fishery management. Priority determination for action is often dependent on which head is most likely to inflict harm most quickly. Within the U.S. Secretary of Commerce's Marine Fisheries Advisory Committee (MAFAC), the bycatch issue has become the central theme of one of MAFAC's four standing committees. As it seeks to establish a strategic planning role, stakeholders on the MAFAC intend to work closely with the NOAA Fisheries leadership to establish perspectives and parameters for framing the bycatch issue, followed by consensus for its strategic consideration and analysis. This presentation will outline the MAFAC's initial plans for addressing the bycatch issue.

Date: August 11, 2003 **Time:** 3:40:00 PM **Room:** 204B **Abstract number:** SO-18-06

Author:

Simonds, K.M.* Western Pacific Fishery Management Council, 1164 Bishop St., Honolulu, HI 96813

Full Title: The International Fishers Forum

Abstract Text: The first and second International Fishers Forum meetings were convened to provide fishermen a medium for the discussion and exchange of ideas for mitigating the interactions of non-target protected species with pelagic and demersal longlines. The first forum, IFF1, focused on seabird-longline interactions, while the second, IFF2, also included a focus on longline-sea turtle interactions. The inclusion of turtles in IFF2 was a response to major declines in Pacific sea turtle populations, although the reasons for these declines include a combination of

anthropogenic effects and are not simply a result of longline fisheries. At both IFF1 and IFF2, individual participants made commitments to conduct various national mitigation initiatives in their longline fisheries. Further, IFF2 requested the Western Pacific Fishery Management Council to present the findings of IFF2 at the next Session of the Committee of Fisheries of the Food and Agriculture Organization (FAO), as well as to encourage the FAO to begin the process of developing an International Plan of Action (IPOA) for the Reduction of Sea Turtle Bycatch from Marine Fisheries throughout the world's oceans. However, the lack of progress by many countries on implementing the provisions of existing IPOAs for sharks and seabirds has suggested that other approaches may be required to promote turtle conservation in the Pacific. This possibility was anticipated by IFF2, which requested that the United Nations Convention on Migratory Species consider how to improve existing and planned international instruments for the purpose of conserving marine turtles and seabirds on a global scale.

Date: August 11, 2003 **Time:** 4:00:00 PM **Room:** 204B **Abstract number:** SO-18-07

Authors:

Leaman, B.M.* International Pacific Halibut Commission, P.O. Box 95009, Seattle, WA 98145-2009
Williams, G.H. International Pacific Halibut Commission, P.O. Box 95009, Seattle, WA 98145-2009

Full Title: Collaborative Efforts by Canada and the United States in Pacific Halibut Bycatch Control

Abstract Text: Excessive and unaccounted mortality of Pacific halibut in non-directed fisheries dates back to the late 1950s, particularly in fisheries conducted by distant-water trawl fleets. Effective management and attainment of optimal yield in the North American halibut setline fishery was frustrated by non-directed fishing mortality, which reached at least 9,000 mt by the early 1960s. Beginning in the mid-1960s, the United States and Canada worked within multilateral organizations and bilateral agreements to reduce this mortality. The most significant reduction occurred after the extension of fisheries jurisdictions by both countries in 1977. However, bycatch mortality increased again as domestic harvesting capacity supplanted the foreign fisheries but was not constrained by the same bycatch limits. Directed action by Canada within the International Pacific Halibut Commission in 1991 resulted in a joint program for staged reduction of halibut mortality in these domestic fisheries by the two countries. Since 1991, major reductions in mortality have occurred in Canada, but more modest reductions have occurred in the United States. We review the basis for success in bycatch reduction in both the international and domestic arenas. In the former, access to harvest was tied to bycatch control. In the latter, the achievement of significant reductions has depended on the provision of appropriate regulatory and management tools to the fishing industry and commitment by the governments. In some instances, the fishing industry now is paying to conduct research on bycatch control because governments have been unable to provide an appropriate regulatory environment.

Date: August 11, 2003 **Time:** 4:20:00 PM **Room:** 204B **Abstract number:** SO-18-08

Authors:

Scott, G.P.* NOAA Fisheries, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149

Full Title: Bycatch Issues Addressed through ICCAT

Abstract Text: The International Commission for the Conservation of Atlantic Tunas (ICCAT) is the regional fisheries organization that undertakes the study and management of tunas and tuna-like fishes in the Atlantic. Studies include research on biometry, ecology, and fisheries oceanography, with a principal focus on the effects of fishing on stock abundance. Largely in response to concerns related to the potential for and impacts of CITES listings of various marine fish species, ICCAT established a Sub-Committee on Bycatch in 1996 to provide scientific advice on issues relating to bycatch resulting from fishing effort directed at Atlantic tuna and tuna-like species. The Sub-Committee guides research and analytical activities on bycatch (especially of sharks) by member nations and cooperating parties, recommends methodological adaptations to national statistical data collection systems in order to better quantify bycatch, and coordinates data gathering and cooperation with other fishery organizations on bycatch issues. Recent activities of the Sub-Committee have largely been directed toward conducting stock assessments of pelagic sharks. (*Prionace glauca*, *Isurus oxyrinchus*, and *Lamna nasus* are the

three species for which stock assessments are anticipated in 2004.) Issues related to the unintended catch of non-fish species have recently come to the forefront and are being discussed by ICCAT.

Date: August 11, 2003 **Time:** 4:40:00 PM **Room:** 204B **Abstract number:** SO-18-09

Authors:

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Arregi, L. AZTI Fisheries and Food Technological Institute, Fisheries Resources Department, Spain

Gomez, E. AZTI Fisheries and Food Technological Institute, Fisheries Resources Department, Spain

Bilbao, A. AZTI Fisheries and Food Technological Institute, Fisheries Resources Department, Spain

Full Title: Catch Rates by Ghost Fishing Tangle Nets of Target and Non-Target Species: An Experimental Approach

Abstract Text: The loss of commercial fishing gear on the ocean bottom can potentially have detrimental consequences to marine communities if the gear preserves its catching abilities (a phenomenon called "ghost fishing") for significant periods of time. This study characterized the loss of monkfish tangle nets off the Spanish coast in the Cantabrian Sea and estimated the consequences on monkfish and non-target species. In order to simulate lost nets, groups of tangle nets was deployed along the continental shelf at depths between 117 and 135 m and on soft bottoms, simulating commercial fishing conditions. Nets were recovered at different intervals (1–12 months), and their catches were recorded in two trials, measuring seasonal changes in catch rates. A fleet of tangle nets was operated following commercial procedures adjacent to the abandoned nets, providing simultaneous estimates of commercial catch rates. Catch rates of monkfish in experimental nets were similar to those in commercial gear up to 4 months from their deployment, after which they declined to zero, a markedly different result if compared to catches by lost gill and trammel nets in shallow waters. Combining experimental catch rates with approximations of the number of tangle nets lost by the fishing fleet, it was estimated that the annual catches by abandoned nets represent approximately 1.2% of the annual commercial monkfish landings in the Cantabrian Sea. Catch composition in the 'abandoned' tangle nets evolved from being initially dominated by fish (mostly monkfish) to being dominated largely by crustaceans (lobsters and crabs), due to increasing catch rates for these scavenger invertebrates with time. Crustacean catch rates remained high during 12 months, suggesting a potential impact of lost nets on these non-target species.

Date: August 11, 2003 **Time:** 5:00:00 PM **Room:** 204B **Abstract number:** SO-18-10

Authors:

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Marshall, K. NOAA Fisheries, 1315 East-West Highway, 13th Floor, Silver Spring, MD 20910

Full Title: Preliminary Review of the Effects of Time/Area Closures in the U.S. Atlantic Pelagic Longline Fishery

Abstract Text: Bycatch of billfish, undersized swordfish, and other species has been a concern in pelagic longline fisheries for many years. Bycatch precludes more productive uses of fishery resources, can slow rebuilding of overfished stocks, and can impose costs on commercial fishing operations. The National Marine Fisheries Service (NOAA Fisheries) initiated efforts to address bycatch in the pelagic longline fishery through the development of the Highly Migratory Species Fishery Management Plan (HMS FMP) and Billfish FMP Amendment. In these documents NOAA Fisheries indicated that time and area closures could be a useful tool to reduce bycatch and bycatch mortality. Three time/area closures including areas in the Gulf of Mexico and off the coasts of South Carolina, Georgia, and Florida were implemented under Regulatory Amendment 1 to the HMS FMP between late 2000 and early 2001. Preliminary analyses of pelagic logbook data indicate that overall effort, as measured by the

number of hooks set, decreased by almost 5% in 2001. Additionally, large decreases in the numbers of fish discarded and kept were reported in the pelagic longline fishery for 2001.

Date: August 12, 2003 **Time:** 8:40:00 AM **Room:** 204B **Abstract number:** SO-18-11

Authors:

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Shah, A.K. Merck Research Laboratories

Full Title: Experiments in the Western Atlantic Northeast Distant Waters to Evaluate Sea Turtle Mitigation Measures in the Pelagic Longline Fishery

Abstract Text: NOAA Fisheries in cooperation with the U.S. pelagic longline fishery implemented a three-year research program in the Western Atlantic Ocean to develop and evaluate sea turtle mitigation measures. Five potential mitigation techniques were evaluated during 687 research sets in 2001 and 2002. Data were collected to evaluate the effectiveness of the mitigation measures and to investigate variables that affect sea turtle interaction rates with pelagic longline gear. A significant reduction in loggerhead catch may be achieved by reducing daylight soak time. 18/0 circle hooks and mackerel bait were found to significantly reduce both loggerhead and leatherback sea turtle interactions when compared with industry standard J hooks and squid bait. Also, circle hooks significantly reduced the rate of hook ingestion by the loggerheads, reducing the post-hooking mortality associated with the interactions. The combination of 18/0 circle hooks and mackerel bait was found to be the most efficient mitigation measure for both loggerhead and leatherback turtles. Mackerel bait was found to be more efficient for swordfish than squid bait, and circle hooks were more efficient for tuna than J hooks.

Date: August 12, 2003 **Time:** 9:00:00 AM **Room:** 204B **Abstract number:** SO-18-12

Authors:

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Diaz, G. NMFS/Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149
Prince, E.D. NMFS/Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149

Full Title: The Atlantic Billfish Bycatch of the Pelagic Longline Fishery

Abstract Text: A multi-national longline fishing fleet operates throughout the Atlantic Ocean to supply the growing global demand for tunas and swordfish. Because a single longline set typically involves the deployment of hundreds, if not thousands, of baited hooks, the capture of non-target species is unavoidable. Included among longline bycatches are the Atlantic istiophorids: sailfish, white marlin, blue marlin and longbill spearfish. With an emphasis on these species, we used several fishery-dependent databases to calculate target:bycatch species ratios (T:B ratios) and examined patterns in these ratios over space and time. In this presentation, we examine the apparent degree of "habitat overlap" between target and bycatch species, test the hypothesis that T:B ratios have been determined primarily by changes in fishing practices, and offer recommendations for further bycatch reduction research.

Date: August 12, 2003 **Time:** 9:20:00 AM **Room:** 204B **Abstract number:** SO-18-13

Authors:

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Brown, C.A.* National Marine Fisheries Service/Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149, USA, craig.brown@noaa.gov

Full Title: Bycatch Estimation System for the U.S. Atlantic Longline Fishery

Abstract Text: The estimation of bycatch (animals that were discarded or released at sea) from the U.S. Atlantic pelagic longline fishery has historically been based on tallies reported by fishermen in logbooks. The initiation of an observer program in 1992 allowed estimates to be based on direct observation of discard rates and condition (live or dead), incorporating the reported effort from the logbooks. However, sparse sampling in a number of spatial (e.g., geographical) and temporal (e.g., quarterly) strata as well as incompleteness in the logbook data meant pooling was required across strata to achieve a minimum number of observations per stratum. An alternative approach to estimating longline bycatch is presented that will improve both the estimates and the calculation of uncertainty about estimates. Models are developed using observer data. A number of important model covariates are identified, such as quarter, year, grouped fishing area, and set target species. The statistical concept of conditionality is applied, and a flexible mixture distribution – the negative binomial – is used for modeling discard data. The results of applying these models to observer and logbook data to estimate discards are presented and are compared to estimates using previous methods

Date: August 12, 2003 **Time:** 9:40:00 AM **Room:** 204B **Abstract number:** SO-18-14

Authors:

Lawseth, D.* Fisheries and Oceans Canada, 3225 Stephenson Point Road, Nanaimo, BC, V9T 1K3
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Full Title: Development and Implementation of Selective Fishing Methods and Policy for Management of Salmon in British Columbia, Canada

Abstract Text: Many coho salmon (*Oncorhynchus kisutch*) stocks in British Columbia declined dramatically during the mid-1980s and 1990s. Growing concerns about this decline prompted an intensive review, and public consultation began in 1997. This resulted in new conservation objectives and management actions for coho salmon, including a goal of near-zero mortality for two critical populations and requirements for fishing gear and methods to become more selective. Selective fishing was defined as the ability to avoid, or release alive and unharmed, non-target stocks or species of concern. In 1998 a new coho recovery plan with Can\$400 million of funding was initiated, including development of selective fishing methods, voluntary retirement of commercial salmon licences, and diversification of commercial fisheries. In 2001 "A Policy For Selective Fishing in Canada's Pacific Fisheries" was released which further defined the principles for selective fishing in Canada's Pacific fisheries. The ability of harvesters to fish selectively is now a fundamental requirement for Canadian fishers to meet the conservation objectives of the federal Fisheries Act, the anticipated requirements of the new national Species at Risk Act (SARA) legislation, and Canada's international commitments to preserve biological diversity and responsibly conserve and harvest fish resources. Since 1998 more than 150 selective fisheries experiments have been conducted in B.C. by the First Nations, recreational and commercial salmon fishing sectors. The main purpose of these experiments was to develop new fishing gears and methods to reduce coho catches, and mortality rates of any coho that are captured incidentally. This presentation will summarize our progress, highlighting the major successes but also some of the continuing challenges

Date: August 12, 2003 **Time:** 10:40:00 AM **Room:** 204B **Abstract number:** SO-18-16

Author:

Fraser, J.* Fraser Research and Development. Vancouver, BC, Canada

Full Title: Reducing Gill-Net Mortalities of Incidentally Caught Species. An Industry Perspective

Abstract Text: The abundance of coho salmon (*Oncorhynchus kitsuch*) has declined over much of their southern range on the Pacific Coast of North America. As a result, Fisheries and Oceans Canada implemented conservation strategies for coho salmon in 1998. Avoidance is an effective and commonly used method to reduce bycatch mortalities. However, an avoidance only strategy would severely reduce the opportunity for commercial salmon

fishing. Therefore, if gill-netters are to continue to be used in fisheries that inadvertently intercept stocks of concern, then a reduction in the mortality rate of released bycatch is necessary. In 1998, management applied mortality estimates of 60-70% for coho released by commercial salmon gillnet fisheries in British Columbia. In a series of studies involving industry and scientists, we demonstrated that short term (48 hr) mortality rates can be reduced to as little as 6% by using short net soak times, modified nets, careful handling of fish on removal from the net, and a newly designed recovery box. This package of selective fishing tools and techniques combined with training and education programs for fishers expand the possible role of gillnets in selective fisheries. Our progress will be discussed from an industry perspective with a brief look at the tools in the gillnet sector selective fishing toolbox. There will also be a short discussion of the problems in successfully implementing this reform.

Date: August 12, 2003 **Time:** 11:00:00 AM **Room:** 204B **Abstract number:** SO-18-17

Authors:

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Yi, K.W. Washington Dept of Fish and Wildlife, 600 Capitol Way N., Olympia, WA, 98501
Dixon, J.D Washington Dept of Fish and Wildlife, 600 Capitol Way N., Olympia, WA, 98501

Full Title: Evaluating Selective Fishing: Survival of Spring Chinook Salmon Captured and Released from Commercial Nets on the Columbia River

Abstract Text: The concept of live capture and selective harvest of adipose-clipped adult spring chinook salmon (*Oncorhynchus tshawytscha*) was tested on the Columbia River. In addition, conventional nets (5.5" and 8" mesh) were compared to the tangle net (3.5" to 4.5" mesh). Experienced gill netters used modified fishing techniques and careful fish handling to compare catch efficiency, immediate and long-term survival, and bycatch between the various sized nets. Live fish were tagged and released for recovery in sport fisheries, commercial fisheries, at hatchery racks and traps, and during spawning ground surveys. Control fish were tagged and released from an adult trap in Bonneville Dam, just upstream of the fishing area. Catch efficiencies among the various net sizes were similar. The tangle nets had higher bycatch than the conventional nets. Although immediate survival between the net types was similar, the post-release survival of fish captured in the tangle nets was higher than conventional net captured fish. We conclude that using conventional gear with short soaks and careful fish handling is not enough to ensure the survival of released spring chinook salmon, but switching to a tangle net, coupled with short soaks and appropriate fish handling, would improve the post-release survival of spring chinook salmon.

Date: August 12, 2003 **Time:** 11:20:00 AM **Room:** 204B **Abstract number:** SO-18-18

Author:

Whisler, G.S.* Oregon Department of Fish and Wildlife, 2021 Marine Drive, suite 103, Astoria, OR 97103

Full Title: Progressive Implementation of Columbia River Stock-Selective Commercial Fisheries

Abstract Text: To address conservation and restoration goals, 12 depressed wild salmonid stocks in the Columbia River Basin have been listed under the federal Endangered Species Act. This significantly reduced commercial gillnet fishing opportunities in the Columbia River and limited the harvest potential of co-mingled hatchery-origin salmonids. Traditional selective management tools relying on avoidance techniques are no longer sufficient to provide economically beneficial commercial fisheries when at-risk and harvestable stocks are not spatially or temporally separated. Basin hatcheries have begun mass-marking spring chinook salmon with an adipose fin clip, providing a visual indicator of hatchery origin. This provides resource managers with the opportunity to develop selective fisheries targeting hatchery-produced salmonids. Based on the precedent set by selective fishery studies in British Columbia, the state of Oregon initiated research in 1999 and 2000 on the application of stock-selective harvest techniques, specifically live-capture, into Columbia River commercial salmon fisheries. This work prompted the states of Oregon and Washington to begin cooperative studies guiding gear refinement and implementation of these techniques in 2001. The viability of gear is gauged by fishery economics, capture method, and survival of

released by-catch. Refinement of live-capture gears and methods is based on data collected during onboard monitoring of demonstration fisheries, test fishing, and survival studies. Specific steps towards implementation have been identified and methods of measuring progress have been developed. Assessment of the continuing transition of Columbia River spring chinook gillnet fisheries to live-capture methodologies has provided valuable information regarding implementation and evaluation of selective harvest practices.

Date: August 12, 2003 **Time:** 11:40:00 AM **Room:** 204B **Abstract number:** SO-18-19

Author:

Brajcich, J.G.* 6295 Aubrey St, Burnaby, BC, V5B 2C9

Full Title: Selectivity Grids in Seine Bunts

Abstract Text: Grids are a response to the Minister of Fisheries Challenge given to the salmon industry in 1998, "that salmon fisheries of the future had to be risk adverse conservation based." Of immediate concern were the cohoes destined for the Thompson and Skeena rivers. The objective of the grids is to allow the safe, in water escapement of non-target species of salmon while retaining target and marketable fish using grids durable enough to address drum, spooling-pin and power block demands while minimizing damage to the fish (scaling and gilling). Grids of various shapes, designs, colours, materials, clarity and location were placed into the bunt of a seine net. Two grids of a kind were installed in the front panel of the bunt while two different grids were installed in the middle panel. A catcher bag, attached to the outside of the bunt with separate chambers for the different grids, contained all of the fish that escaped through the grating to determine size, species, DNA and any preference by the fish for the various shapes of openings, grid design or texture. Due to the salmon's migratory timing and patterns, research time is very limited. Over the last four seasons, experiments with the grids have proven very successful. All salmon will access the grids, with some preference indicated by species to grid shapes and colour. A high percentage of non-target cohoes (~70%) passed through the gridding while retaining (~85%) of target sockeye. Progress in all areas to be discussed.

Date: August 12, 2003 **Time:** 12:00:00 PM **Room:** 204B **Abstract number:** SO-18-20

Author:

Tufts, B.L.* Department of Biology, Queen's University, Kingston, Ontario, Canada, K7L 3N6

Full Title: Maximizing Recovery and Survival in "Live-Release" Recreational Fisheries

Abstract Text: For the past several years, we have been using a physiological approach to investigate the factors that influence the physiological response of fish to angling under different conditions. The main goal of these studies has been to determine the best ways to maximize the conservation strategy of "live-release" in recreational fisheries. These studies have shown that most fish will fully recover from angling, if environmental conditions and handling practices are appropriate. We have also found, however, that there are many endogenous and exogenous factors that influence the physiological response to angling in fish. Factors such as water temperature, nutritional status, air exposure and body size can all influence the magnitude of the physiological disturbance following angling and the time required for recovery. Under extreme environmental conditions (eg. high water temperatures), or when several of these factors act in combination, there may also be a reduction in the survival of fish that are released after angling. These studies can therefore be used to identify conditions, or angling practices, that may be inappropriate for live-release regulations. Recently, we have also become involved in studies to minimize fish stress and maximize survival following "live-release" angling tournaments. In recent years, these events have become an important use of fisheries resources, but their potential impact on fish populations is somewhat controversial. Our progress in this area will also be discussed.

Panel discussion "Selective harvest of salmonids - where are we going?" with the six previous speakers to be moderated by Geraldine Vander Haegen

Date: August 12, 2003 **Time:** 1:40:00 PM **Room:** 204B **Abstract number:** SO-18-21

Authors:

Haflinger, K.E.* P.O. Box 74, Vashon, WA 98070

Full Title: Reducing Bycatch through Avoidance: Utilizing Near-Real-Time Catch Sampling and Analysis of Spatial Patterns in Bycatch Occurrence to Help Fleets Avoid Bycatch

Abstract Text: Trawl fleets operating off the coasts of Washington, Oregon, and Alaska have been forced to deal with increasingly stringent quotas for the bycatch of salmon, crab, halibut, and rockfish. These same fleets are required in many instances to carry either one or two federal observers who sample catch and file information daily with the National Marine Fisheries Service in Seattle. Observer information is made available to vessel owners who contract with Sea State Inc. to provide daily analysis of spatial trends in catch data. Information in the form of maps, tables, and commentary are relayed back to captains on a daily basis, allowing for rapid reaction to areas of high bycatch. The recent development of cooperatives for harvesting pollock and whiting has led to a novel program of area closures. Contractual arrangements among cooperatives limit access to areas of high bycatch to fleets demonstrating low bycatch rates. These "hotspot" closures can change weekly and require significant effort on the part of fishermen to both supply and keep abreast of current bycatch information. Although complex, these programs can lead to appreciable bycatch reduction and increased fishing opportunities for fleets that might be otherwise restricted.

Date: August 12, 2003 **Time:** 2:00:00 PM **Room:** 204B **Abstract number:** SO-18-22

Authors:

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Full Title: Bycatch Reduction Technologies: From Concept to Regulation

Abstract Text: In the last two decades, there has been substantial development and implementation of bycatch reduction technologies (BRTs) designed to achieve species selection and minimize discards in commercial fisheries. An analysis of recent BRT case studies reveals the following essential elements of a sound BRT design, test and evaluation program, and implementation procedure. First, there must be general agreement between the participants in the fishery, other stakeholders, and regulators that there is a bycatch problem, and that a reduction in bycatch is required. Second, the BRT design team must include scientists and fishermen. Third, there must be a standard protocol for the evaluating the effectiveness of any potential BRT. This protocol must specify the acceptable level of reduction in the catch of the target species (if any), the required reduction in bycatch, and the experimental design and statistical methods used to test and evaluate the performance of the BRT. Fourth, the BRT must be both functional and consistently effective under commercial fishing operations. Finally, resource managers must require the BRT in fisheries regulations, and there must be adequate at-sea monitoring and enforcement to ensure that the bycatch reduction goal is achieved.

Date: August 12, 2003 **Time:** 2:20:00 PM **Room:** 204B **Abstract number:** SO-18-23

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Illingworth, J. Archipelago Marine Research Ltd., 525 Head Street, Victoria, British Columbia, V9A 5S1, Canada

Full Title: The Efficacy of Electronic Monitoring in British Columbia's Halibut Longline Fishery

Abstract Text: Large-scale deployment of electronic monitoring (EM) systems occurred in the 2002 British Columbia halibut longline fishery to evaluate the technology as an alternative to observer-based at-sea monitoring. Catch items identified by EM represented over 60 fish, invertebrate, and seabird species or species groupings. Data from fishing trips where EM and observers were deployed (55% of the 59 EM trips) were compared by total overall catch, total catch by set, and catch by individual hook. EM and observer identifications overall agreed within 2% and, when matched by individual hook, agreed in over 90% of the catch records. Individual species identification rates were high for most of the 15 most abundant species (98% of the catch). Non-distinct species were not identified well by EM, and sample sizes were too small among half the species for estimation of an EM identification rate. Close agreement between EM and observer monitoring was also evident with species utilization determination (i.e., kept or discarded) and time, location, and depth at set start and finish. Compared with at-sea observers, EM provided excellent catch accounting overall and for common distinctive species but did not provide the same level of species resolution, particularly with the less-common, non-distinctive species. Considering the necessity for higher fleet coverage levels, the unsuitability of many vessels to host observers, and the substantially lower cost of EM, a combined EM/observer-based monitoring approach should be used for the halibut longline fishery.

Date: August 12, 2003 **Time:** 3:00:00 PM **Room:** 204B **Abstract number:** SO-18-25

Authors:

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Gabriel, W.L.* National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Woods Hole, MA 02543

Full Title: Relative Precision of Discard Rate Estimates for the Northeast Groundfish Complex

Abstract Text: We examined the relative precision (defined here as the ratio of the standard error of estimated discard to the estimated discard) for 17 New England groundfish stocks using observer coverage and landings data for the year 2000. For each stock, a stratified ratio estimate of discard and its variance was made with gear type and season (quarter year) as stratification variables. We determined the projected increase in precision with increased sampling effort (number of fishing trips observed) under two scenarios: a doubling of sampling intensity relative to 2000 levels and an increase in sampling effort equivalent to a court-ordered 5% trip coverage level in 2002. Our focus throughout was on the effects of changes in sampling effort (number of trips) rather than in proportional coverage *per se*. The estimates of relative precision obtained under the full stratification scheme and sampling effort levels in 2000 differ substantially by stock, ranging from relatively precise estimates for stocks such as Gulf of Maine cod, Georges Bank haddock, witch flounder, and American plaice (relative precision < 0.2) to highly variable estimates for Southern New England winter flounder and windowpane flounder with relative precision > 1.0. Increases in sampling effort to double the 2000 levels resulted in a substantial increase in precision with 77% of the stocks exhibiting relative precision levels less than 40%. For the 5% coverage level, the modal level of precision was < 0.2. We also explored the implications of using a reduced or collapsed stratification scheme in which observer data are pooled over the year and only gear type is considered. The general conclusions concerning levels of precision attained under the full stratification scheme appeared to be generally robust.

Date: August 12, 2003 **Time:** 3:40:00 PM **Room:** 204B **Abstract number:** SO-18-26

Authors:

Burns, K.M.* Mote Marine Laboratory, 1600 Ken Thompson Parkway, Sarasota, FL 34236

Full Title: Bycatch Data in Recreational Fisheries

Abstract Text: In the Gulf of Mexico and South Atlantic, the grouper/snapper complex supports important recreational and commercial reef fish fisheries. Studies supported by the NOAA/NMFS Marine Fisheries Initiative and Florida Sea Grant, targeting red grouper *Epinephelus morio*, gag *Mycteroperca microlepis*, red snapper *Lutjanus campechanus*, and vermilion snapper *Rhomboplites aurorubens* swimbladder physiology and the quantification and

survival of undersized bycatch for these species, were begun in 1998. Data and research specimens were collected from the hook-and-line recreational and recreational for-hire sectors. Effects of depth-induced trauma on target species' swimbladder physiology and survival were studied in the laboratory through simulations of barotrauma using fish hyperbaric chambers. Simultaneous shipboard studies to quantify the bycatch were conducted by counting all the target species caught per fishing trip mainly off both coasts of Florida. Undersized target species captured at various depth increments (0-12.2 m, 12.5-21.3 m, 21.6-30.5 m, 30.8-61.0 m, and 61.3+ m) were tagged (some fish vented and others not) and released by fisheries staff and volunteer taggers (fishers) aboard recreational vessels, charter boats, and headboats. Moribund target fish were brought to the lab for necropsy to determine the cause of acute mortality and for comparison with fish from the hyperbaric chamber studies. Survival of fish caught on J versus circle hooks is also being compared through tag returns. Data on fish movement show that reef fish of all sizes move (some moving over 160 km) from the original tagging site.

Date: August 12, 2003 **Time:** 4:00:00 PM **Room:** 204B **Abstract number:** SO-18-27

Authors:

Osborn, M.F.* Atlantic Coastal Cooperative Statistics Program, 1444 Eye Street, 6th Floor, Washington, DC 20005
Compton, A.L. Atlantic Coastal Cooperative Statistics Program, 1444 Eye Street, 6th Floor, Washington, DC 20005

Full Title: Improving Bycatch Data on the Atlantic Coast through the ACCSP

Abstract Text: The Atlantic Coastal Cooperative Statistics Program (ACCSP) is a cooperative state-federal program to design, implement, and conduct marine fisheries statistics data collection programs and integrate those data into a single data management system that will meet the needs of fishery managers, scientists, and fishermen. The ACCSP was established in 1995 through a Memorandum of Understanding with the 15 Atlantic coast states (including the District of Columbia), the Potomac River Fisheries Commission, three regional fisheries management councils, NOAA Fisheries, the U.S. Fish and Wildlife Service, and the Atlantic States Marine Fisheries Commission. The ACCSP established minimum standards for data collection and management for catch and effort, socio-economic, biological, and bycatch statistics through a series of planning meetings. Standards are developed with input from experts from all of the program partners and are developed by consensus. Program partners are responsible for implementing these standards into their data collection activities, while ACCSP program staff maintain a centralized data management system with harmonized data from all partners and provide a powerful end-user analytical tool called Business Objects. Operational funding to implement the program began in 1999, and the current annual budget is \$3.5 million. Funding is allocated to partners through an annual competitive process. This presentation discusses specific bycatch standards and their development, partner efforts to implement the standards, how ACCSP funding is being used to improve the collection and use of bycatch data, and what is needed for full implementation of the bycatch program on the Atlantic coast.

Date: August 12, 2003 **Time:** 4:20:00 PM **Room:** 204B **Abstract number:** SO-18-28

Authors:

Lucy, J.A.* Sea Grant MAP, Virginia Institute of Marine Science, College of William and Mary, Gloucester Pt., VA 23062

Full Title: Catch and Release in Marine Recreational Fisheries - Key Issues and Research Progress

Abstract Text: The need to better manage all fishing activity, whether commercial or recreational, has made catch and release a major component of marine fisheries management. Surveys indicate that in top-ranked U.S. recreational fisheries, typically better than 50% but sometimes as high as 90% of yearly catches are discarded/released alive. This situation, along with marine angling community interest in fishing conservation ethics, helps drive demands for angling regulations backed by strong research results. Selected research projects are highlighted in this presentation, including their application to needs prioritized at the 1999 Symposium on Catch and Release in Marine Recreational Fisheries. For example, additional work is needed on short-term survival of released marine fish, but there exists a greater need for data on long-term, post-release survival. Pop-up satellite tag

technology is helping determine short- and long-term survival and behavior patterns of billfish released in fishing tournaments compared to live billfish released as bycatch in longline fisheries. Short- and long-term release mortality issues (hook design, temperature, fish size, live-fish weigh stations for fishing tournaments, etc.) are under study for specific inshore fisheries, e.g., striped bass, red drum, and spotted seatrout. Only limited work is available on outcomes of hooks left in released fish. Australia is studying attitudes and practices of anglers regarding catch and release. From this and ongoing fisheries research, an educational campaign is being developed to increase public awareness regarding improving survival of released, line-caught fish. The project warrants consideration as a possible model for other countries to explore.

Date: August 12, 2003 **Time:** 4:40:00 PM **Room:** 204B **Abstract number:** SO-18-29

Authors:

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Full Title: Managing the Nation's Bycatch and Collaborative Research

Abstract Text: For a number of years, collaborative fisheries research among commercial marine fisheries participants, scientists, and managers has attempted to address the difficult problem of reducing the capture of nontarget species or "bycatch" in commercial fisheries. Recent U.S. Congressional funding has invigorated this effort. The creation of the Cooperative Research Partners Initiative (CRPI) in the Northeast Region of the National Marine Fisheries Service has provided funding and a venue for peer review of bycatch research projects. The CRPI began in 1999 to enhance the data for fishery management decisions and improve communications among the commercial groundfish industry, fishery scientists, and managers. Currently there are 14 research projects funded under CRPI that study bycatch or fishing gear selectivity. Total funding exceeds \$2 million. This presentation will discuss these projects with specific attention given to the need to develop mechanisms to incorporate collaborative research results into fishery management.

Date: August 12, 2003 **Time:** 5:00:00 PM **Room:** 204B **Abstract number:** SO-18-30

Authors:

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Full Title: Reduction of Bycatch/Discards in Gulf of Maine Groundfish Fisheries: Composite Mesh Codend and Escape Window Effects on Retaining Non-Target Fish

Abstract Text: The at-sea discarding of fish harvested from the ocean and associated discarding mortalities have been recognized and noted by fisheries scientists as inherent problems in the management of world fisheries for a great many years. Such practices constitute not only waste of a valuable resource, but perhaps more importantly these practices help contribute to observed decline in many of the world's marine fisheries. This has led many to speculate that continuing bycatch and discard practices will lead to collapse of commercial fisheries and associated community infrastructure. Bycatch reduction studies are not new. However, there has been an explosion in development of such programs and techniques in recent years. While these studies have resulted in a small number of bycatch reduction devices being adopted into commercial fishing operations, in general success has been limited. This presentation will outline results from collaborative research studies that demonstrate the effectiveness of novel codend configurations and escape windows in reducing bycatch and discard in Gulf of Maine groundfish fisheries. The role of bycatch reduction in conservation of fish stocks will be discussed.

Date: August 13, 2003 **Time:** 8:40:00 AM **Room:** 204B **Abstract number:** SO-18-31

Authors:

Lee, B.J.* F/V Ocean Reporter, 25 Pleasant Street, Rockport, MA 01966-2151

Full Title: Fishermen Cooperating With Scientists in Bycatch Studies

Abstract Text: Findings of three bycatch research studies conducted jointly by Captain Bill Lee and marine biologist Allan Michael, Ph.D., will be reviewed: (1) "Bycatch Reduction with the Use of Grates," funded by the Northeast Consortium; (2) "Baited Underwater Video Project," funded by the Northeast Consortium; and (3) "Development of Video Techniques for Bycatch Reduction Studies," an ongoing project funded by the National Marine Fisheries Service. A 15-minute video will be shown as a backdrop to the oral presentation. The video footage was shot in the Gulf of Maine from a working commercial fishing vessel (F/V Ocean Reporter), as well as from other commercial fishing vessels engaged in a variety of fishing methods. The footage, shot during the three abovementioned studies, will demonstrate bycatch reduction with the use of grates on mobile fishing gear in groundfish and shrimp fisheries, and show the impact of scallop dredges on the ocean bottom. The footage also will demonstrate how increased mesh size can contribute to the reduction of bycatch in gill netting and how increased hook size can reduce hooking bycatch.

Date: August 13, 2003 **Time:** 9:00:00 AM **Room:** 204B **Abstract number:** SO-18-32

Authors:

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LaFargue, J.P. NOAA Fisheries, Northwest Fisheries Science Center, 2725 Montlake Blvd. E., Seattle, WA 98112

Full Title: West Coast Groundfish Observer Program Initial Data Report and Summary Analyses

Abstract Text: On May 24, 2001, NOAA Fisheries established the West Coast Groundfish Observer Program (WCGOP) to implement the Pacific Coast Groundfish Fishery Management Plan. Although there have been some pilot programs on the West Coast that have observed volunteer vessels, this is the first coast-wide mandatory observer program for the non-whiting fleet. The goal of the WCGOP is to collect data on the discard of West Coast groundfish to be used in assessing the total fishing mortality of a variety of groundfish species. In the first year of the program, the observations were focused on the trawl fleet; however, the program has begun pilot coverage on the fixed-gear and open access fleets as well. This program is unique because observers are residents in one of thirteen ports. Additionally, trawl vessels are selected to be observed for the entire two-month trip limit period. The observations from the first year of observer information have been summarized. The discard and bycatch rates for 23 species were estimated using the ratio estimator technique after post-stratifying sampled tows into trip-limit period, depth, and target strategies. These initial results are being used to adjust the sampling scheme. In addition, these data are being incorporated into a bycatch management model that is being used to guide West Coast groundfish management.

Date: August 13, 2003 **Time:** 9:20:00 AM **Room:** 204B **Abstract number:** SO-18-33

Authors:

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Koi, D. National Marine Fisheries Service

Full Title: Bycatch in the Gulf of Mexico Shrimp Fishery

Abstract Text: Over the past 10 years, a total of 10,674 observer days have been secured by shrimp bycatch observers in the Gulf of Mexico and along the east coast of the United States. Analysis revealed that on average about 27 kg of organisms per hour are taken during trawling operations in the Gulf of Mexico. Examination of the composition of the organisms revealed that about 67% of the catch by weight is composed of finfish (mostly groundfish species), 16% by commercial shrimp species, 13% by non-commercial shrimp crustaceans, and 4% by non-crustacean invertebrates. Although groundfish species make up the majority of the bycatch taken in shrimp trawls, three species (king mackerel, *Scomberomorus cavalla*; Spanish mackerel, *S. maculatus*; and red snapper, *Lutjanus campechanus*) have received a great deal of attention because of their commercial and recreational importance and the potential for significant impacts on their population abundance through shrimp trawling activities. Average catch of these three species is generally below 0.5 kg per hour.

Date: August 13, 2003 **Time:** 9:40:00 AM **Room:** 204B **Abstract number:** SO-18-34

Authors:

Lent, R.* NOAA Fisheries, 1315 East-West Highway, 14th Floor, Silver Spring, MD 20910

Full Title: NOAA Fisheries National Bycatch Strategy

Abstract Text: The National Marine Fisheries Service (NOAA Fisheries) has developed a national bycatch strategy (Strategy) for addressing finfish and protected species bycatch in our Nation's fisheries. The Strategy may be found on the new NOAA Fisheries bycatch website (<http://www.nmfs.noaa.gov/bycatch.htm>) and serves as a focal point for all bycatch reduction activities already underway at NOAA Fisheries. The Strategy builds upon the 1998 NOAA Fisheries bycatch study entitled "Managing the Nation's Fisheries" by assessing progress on the recommendations of that study and prioritizing the data collection, research, and regulatory actions necessary to continue addressing bycatch. Ongoing gear technology research for bycatch avoidance and/or minimizing injury is also included in this focused effort. In addition, the Strategy establishes a workgroup that is evaluating Standardized Bycatch Reporting Methodology and its application in fisheries. International activities, critical for progress on migratory and/or transboundary species such as sea turtles and certain finfish (sharks, billfish, tunas), are also part of the overall Strategy. Working with our Council partners, there have been significant accomplishments in the area of bycatch reduction, and this national Strategy continues these efforts by assessing and prioritizing the tasks ahead.

Date: August 13, 2003 **Time:** 10:40:00 AM **Room:** 204B **Abstract number:** SO-18-36

Authors:

Powers, J.E.* NMFS/Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149

Full Title: Report of the NOAA Fisheries National Working Group on Bycatch

Abstract Text: The National Marine Fisheries Service recently issued a National Bycatch Strategy to address issues related to management of bycatch within the nation's fisheries. One component of that strategy was the establishment of a National Working Group on Bycatch (NWGB) to develop a national approach to standardized bycatch reporting methodologies. This work was to be the basis for regional teams (also established in the National Bycatch Strategy) to make more specific fishery-specific recommendations. The NWGB reviewed regional issues related to fisheries and bycatch and discussed advantages and disadvantages of various methods for estimating bycatch, including fishery-independent surveys, self-reporting through logbooks, port sampling, recreational sampling, at-sea observation including observers, digital video cameras, digital observers, alternative platforms and remote monitoring and stranding networks. At-sea sampling programs for 104 fisheries were classified as having Baseline, Pilot, Developing, Mature or no at-sea observation program. Additionally all of these fisheries were rated as to their vulnerability (High, Moderate or Low) to bycatch of fishery resources, marine mammals and endangered species and birds. These results should be utilized by the regional teams established through the National Bycatch Strategy to develop, refine, and determine implementation plans. These activities should include review and refinement of the fishery-specific estimates given here.

Date: August 13, 2003 **Time:** 11:00:00 AM **Room:** 204B

One-hour panel discussion to be moderated by Rebecca Lent; panelists include Mike Hirshfield (*Oceana, Washington, DC*), David Witherell (*North Pacific Fishery Management Council, Anchorage, AK*), and John Gauvin.

SPONSOR: NOAA Fisheries; American Fisheries Society Potomac Chapter